# No. 3

mass = 1 kg
P1 = 100 bar
v1 = 0.012 $m^3/_{kg}$
**From 1 to 2 Isothermal**
P2 = 30 bar
T2 = T1
**From 2 to 3 P = Const.**
P3 = 30 bar
**From 3 to 1 $PV^{1.3}$ = Const.**
T1 = 311 ºC
X1 = 0.667
T2 = 311 ºC

| T | 300 | 311 | 350 |
|---|---|---|---|
| vg | 0.0812 | V2 | 0.0905 |

$^{350-311}/_{350-300} = {}^{0.0905-V2}/_{0.0905-0.0802}$
V2 = 0.083246 $m^3/_{kg}$
$P1V1^{1.3} = P3V3^{1.3}$
V3 = 0.0303 $m^3/_{kg}$
$X3 = {}^{V}/_{vg}$ = 0.4546 $m^3/_{kg}$
T3 = 233.8 ºC
W1-2 = U2 - U1
U1 = xug + (1-x)uf = 2161.384 $^{kJ}/_{kg}$

| T | 300 | 311 | 350 |
|---|---|---|---|
| ug | 2933 | U2 | 3020 |

U2 = 2640.14 $^{kJ}/_{kg}$
W1-2 = U1 - U2 = 478.756 $^{kJ}/_{kg}$
W2-3 = P(V3 - V2) = -158.838 $^{kJ}/_{kg}$
$W3\text{-}1 = {}^{P3V3 - P1V1}/_{n-1}$ = -97 $^{kJ}/_{kg}$
Q1-2 = 0
Q2-3 = H3 - H2
H3 = hf + xhfg = 2205.265 $^{kJ}/_{kg}$

| T | 300 | 311 | 350 |
|---|---|---|---|
| hg | 2995 | H2 | 3231 |

H2 = 3046.92 $^{kJ}/_{kg}$
Q2-3 = -841.655 $^{kJ}/_{kg}$
Q1-3 = U1 - U3 + W
U3 = xug + (1-x)uf = 1730.9054 $^{kJ}/_{kg}$
Q3-1 = 333.4786 $^{kJ}/_{kg}$
S1 = xsg + (1-x)sf = 4.1109 $^{kJ}/_{kg}$ K

| T | 300 | 311 | 350 |
|---|---|---|---|
| sg | 6.541 | S2 | 6.921 |

S2 = 6.6246 $^{kJ}/_{kg}$ K
S3 = xsg + (1-x)sf = 4.2547 $^{kJ}/_{kg}$ K